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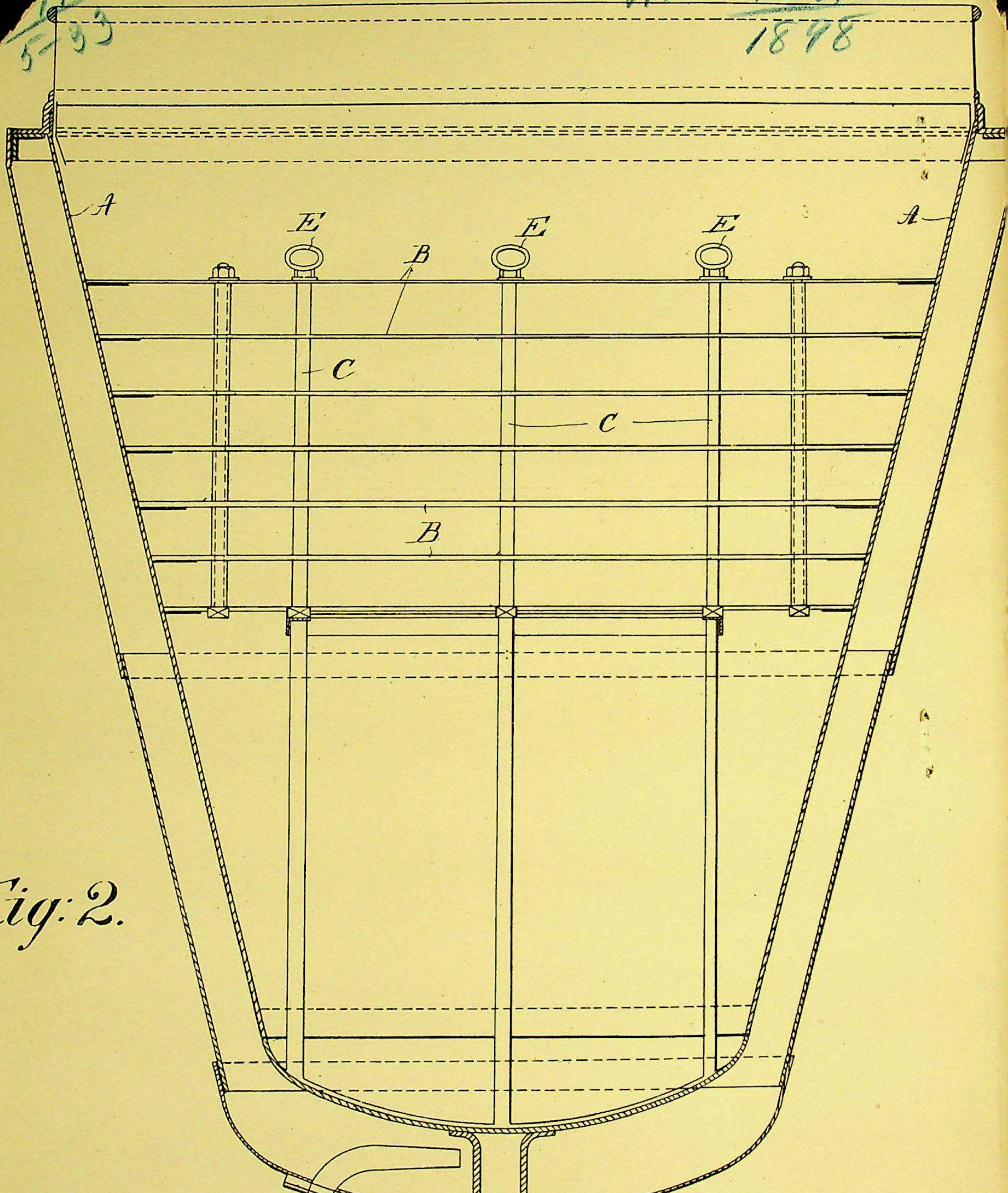

Fig: 2.

426/29 EVERAGES

28 see Pasteurizing 37

1899 ①

RECORDED

99/52

N° 2031 A.D. 1898

DUPLICATE

Date of Application, 25th Jan., 1898

Complete Specification Left, 16th Nov., 1898—Accepted, 21st Jan., 1899

PROVISIONAL SPECIFICATION.

An Improved Process for the Manufacture of Beer by the Sterilization of the Worts in the Vat during the Boiling.

I, Hubert Georgin, of 29, Rue des Ursulines, Brussels, in the Kingdom of Belgium, do hereby declare the nature of this invention to be as follows:—

My invention has for its object an improved process for the production of beer communicating to the latter fresh properties, among others a property of indefinite preservation without the addition of any foreign substance and showing a considerable economy comparatively over the systems of brewing at present in use by an excess in density or quantity of production for a given quantity of material placed in the vat.

My improved process is applicable to the manufacture of all kinds of beer, in which it preserves their peculiar character, whilst communicating to them new properties and rendering them capable of being exported without any addition of alcohol, chemical products or other like substance.

The invention consists in treating beer worts compounded in the ordinary manner in boilers open or closed of any suitable form but preferably tapering and divided by perforated plates into compartments or horizontal divisions communicating one with another by means of a number of small holes. These perforated plates, which must be separated or arranged at distances apart of 10—40 m.m. according to the height of the vat or boiler, in consequence of the resistance they oppose to the circulation of the worts during the boiling, have for their effect to develop in the bottom of the boiler temperatures sufficiently high to destroy all evil ferments, bacteria or other micro-organisms at the same time that they produce by filtration of the wort over the perforated surfaces a deposit of all azotic, albuminous, glutinous or the like substances.

This high temperature of the worts in the lower compartment has for effect to engender a movement of ascension of the hottest wort and a contrary movement of the wort cooled at the surface of the vat, the temperature of which does not exceed 100° C. The result is a rapid circulation of the whole of the wort, each portion of which passes successively from the bottom to the surface and from the surface to the bottom, producing a uniformity of treatment of the whole mass which alternately undergoes expansion and superheating. The albuminoid coagulated substances in consequence of the high temperature of the wort must be precipitated and then afterwards separated which is the object of the operation hereinafter described, which I call the "calorific shock."

The boiling after a certain time is suddenly stopped. The worts incompletely boiled are conveyed into refrigerating worms of any suitable kind, but having a large refrigerating power, such as refrigerators working by compressed air, and are then directly returned to the boiler having perforated plates.

This operation, which for export beers must be repeated one or more times according to the distance and the climate of the country for which they are destined or the method of transport, must last each time from one hour and a half to two hours. A longer time would not deleteriously affect the sterilization of the wort but would occasion a loss in quantity by evaporation. These details will suffice to determine the dimensions of the pumps and of the refrigerating apparatus. Of course the "calorific shock" may be entirely dispensed with in manufacturing beers for local consumption. In this case the wort purified and filtered by the action alone of the perforated plates may remain without danger in the cooling vat, which with ordinary worts would cause such losses particularly in summer when the atmospheric conditions favour the development of deleterious and evil ferments.

The aeration of the worts so useful for the fermentation may be effected in all security, because the false ferments contained in the worts are destroyed and the substances which favour them and develop them are eliminated, so that the dangers which surround ordinary worts no longer need be feared.

The wort discharged from the cooler is more limpid and clear, because the gluten which renders cooled wort turbid is eliminated, which denotes a radical change of constitution seeing that by the ordinary process the wort would be completely turbid. After boiling and cooling, my worts are what is called in brewery terms "asleep." I allow them to remain in this condition in the cellars for six to eight days. The substances removed by the boiling at a very high temperature precipitated by the "calorific shock" are deposited slowly, and then the wort is separated from the bottom by decantation and mixed with yeast. The wort thus treated, sterilized and purified gives a healthier, richer and more favourable medium of propagation. The fermentation of it is slower but it takes place admirably. The worts have no tendency to become acid and yield a less exhausted beer. The elimination of the albuminoid and other substances being more complete, false lactic, acetic and butyric fermentations are avoided.

The slower and more regular fermentation produces a better keeping beer which has a better flavour and which is more limpid and is of extraordinary fineness.

The attenuation undergone is less. It causes less loss of alcohol which is important for export beers and which allows of a longer time in the boiler without causing the density to fall below the normal level whence a considerable increase of production is obtained.

The insoluble glutinous substance and lumps which affect the yeast and the fermentation are retained by the perforated plates and, if any remain, by being deposited in the cooling vat. The beer leaves no, or almost no, residue at the bottom of the casks; no deposit in bottles; transport and climatic temperature do not modify in any way its condition of perfect keeping; which results have never hitherto been attained by the old brewing processes.

My process, purely physical and mechanical, is naturally sure and practical. Its effects are durable, whilst the use of chemical ingredients would destroy the nature of the beer and only produce temporary effects or no effects at all. The clarification being little required, the danger is not incurred of introducing into the beer corrupt clarifying substances which decompose or by decomposition weaken the nature and the quality of the beer.

A worts boiling vat having a sterilizing apparatus arranged conformably with my invention consists as follows:—

The plates aforesaid to the number of six are arranged about 140 millimetres apart. The lower plate is at 396 millimetres from the bottom of the boiler. They are perforated with an innumerable number of holes of a diameter of 1·72 millimetres. The periphery of the plates fits closely to the walls of the vat. All the plates are maintained at invariable distances by the ends of tubes through which there pass from end to end copper rods which serve to hold the entire arrangement together. Four loops allow the apparatus being withdrawn in its entirety by means of a pulley hooked on from above.

I would specially point out that the sizes indicated in the arrangement hereinbefore described have no permanent character and are only shown as an example of the application of the invention.

Dated this 24th day of January 1898.

WM. P. THOMPSON & Co.,
Of 6, Lord Street, Liverpool, Agents for the Applicant.

COMPLETE SPECIFICATION.

An Improved Process for the Manufacture of Beer by the Sterilization of the Worts in the Vat during the Boiling.

I, Hubert Georgin, of 29, Rue des Ursulines, Brussels, in the Kingdom of Belgium, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention has for its object an improved process for the production of beer communicating to the latter fresh properties, among others a property of indefinite preservation without the addition of any foreign substance and showing a considerable economy comparatively over the systems of brewing at present in use by an increase in density or quantity of production for a given quantity of material placed in the vat.

My improved process is applicable to the manufacture of all kinds of beer, in which it preserves their peculiar character, whilst communicating to them new properties and rendering them capable of being exported without any addition of alcohol, chemical products or other like substances.

The invention consists in treating beer worts, compounded in the ordinary manner, in boilers open or closed of any suitable form but preferably tapering and divided by perforated plates into compartments or horizontal divisions communicating one with another by means of a number of small holes. These perforated plates, which must be separated or arranged at distances apart of 10—40 centimetres according to the height of the vat or boiler, in consequence of the resistance they oppose to the circulation of the worts during the boiling, have for their effect to develop in the bottom of the boiler temperatures of from 110° to 120° Centigrade, sufficiently high to destroy all injurious ferments, bacteria or other micro-organisms, at the same time that they produce by filtration of the wort over the perforated surfaces a deposit of all nitrogenous albuminous, glutinous or the like substances.

This high temperature of the worts in the lower compartment has for effect to engender a movement of ascension of the hottest wort and a contrary movement of the wort cooled at the surface of the vat, the temperature of which does not exceed 100° C. The result is a rapid circulation of the whole of the wort, each portion of which passes successively from the bottom to the surface and from the surface to the bottom, producing a uniformity of treatment of the whole mass which alternately undergoes expansion and superheating. The coagulated albuminoid substances in consequence of the high temperature of the wort are precipitated and subsequently separated, which is the object of the operation hereinafter described, which I call the "caloric shock."

The boiling after a certain time is suddenly stopped. The worts incompletely boiled are conveyed into refrigerating worms of any suitable kind, but having a large refrigerating power, such as refrigerators working by compressed air and are thereby cooled to say 15° Cent., or the temperature of the atmosphere and are then directly returned to the boiler having perforated plates.

This operation, which for export beers must be repeated one or more times according to the distance and the climate of the country for which they are destined, or the method of transport, must last each time from one hour and a half to two hours. A longer time would not deleteriously affect the sterilization of the wort but would occasion a loss in quantity by evaporation. These details will suffice to determine the dimensions of the pumps and of the refrigerating apparatus. Of course the "caloric shock" or sudden cooling may be entirely dispensed with in manufacturing beers for local consumption. In this case the wort purified and filtered by the action alone of the perforated plates is not returned to the boiler but may remain without danger in the cooling vat, which with ordinary worts would cause such losses particularly in summer when the atmospheric conditions favour the development of deleterious ferments.

The aeration of the worts so useful for the fermentation may be effected in all security, because the false ferments contained in the worts are destroyed and the substances which aid and develop them are eliminated, so that the dangers to which ordinary worts are liable need no longer be feared.

The wort discharged from the cooler is more limpid and clear, because the gluten which renders cooled wort turbid is eliminated, which denotes a radical change of constitution seeing that by the ordinary process the wort would be turbid. The worts may then remain in the cellars for six to eight days. The substances coagulated by the boiling at a very high temperature, precipitated by the "calorific shock" are deposited slowly, and then the wort is separated from the sediment at the bottom by decantation and mixed with yeast. The wort thus treated, sterilized and purified gives a healthier, richer and more favourable medium of propagation. The fermentation of it is slower but it takes place admirably. The wort has no tendency to become acid and yields a less exhausted beer. The elimination of the albuminoid and other substances being more complete, lactic, acetic and butyric and other false fermentations are avoided.

The slower and more regular fermentation produces a better keeping beer which has a better flavour and which is more limpid and is of extraordinary fineness.

The attenuation undergone is less. It causes less loss of alcohol which is important for export beers and which allows of a longer time in the boiler without causing the density to fall below the normal level whence a considerable increase of production is obtained.

The insoluble glutinous substance and lumps which affect the yeast and the fermentation are retained by the perforated plates and, if any remain, by being deposited in the cooling vat. The beer leaves practically no residue at the bottom of the casks; no deposit in bottles; transport and climatic temperatures do not modify in any way its condition of perfect keeping; which results have never hitherto been attained by the old brewing processes.

My process, purely physical and mechanical, is natural, sure, and practical. Its effects are durable, whilst the use of chemical ingredients would destroy the nature of the beer and only produce temporary effects or no effects at all. The clarification being little required, the danger is not incurred of introducing into the beer corrupt clarifying substances which decompose or by decomposition weaken the nature and the quality of the beer.

A worts boiling vat A having a sterilizing apparatus arranged conformably with my invention is shown in the accompanying drawing in Fig. 1 in its simplest form, and in Fig. 2 in a modification thereof, of slightly different shape, and provided with a steam jacket with inlet and outlet.

The plates B aforesaid to the number of six are arranged about 142 millimetres apart. The lower plate is about 400 millimetres from the bottom of the boiler. They are perforated with a great number of holes of a diameter of about 2 millimetres. The periphery of the plates fits closely to the walls of the vat. All the plates are maintained fixed at the requisite distances by the ends of tubes C serving as distance sleeves or supports and through which there pass from end to end copper rods D which serve to hold the entire arrangement together. Four loops E allow of the apparatus being withdrawn in its entirety by means of a pulley hooked on from above.

I would specially point out that the dimensions indicated in the arrangement hereinbefore described are only approximate and are given as an example of the application of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The improved process for the sterilization and epuration of beer worts, consisting in subjecting the wort during the boiling one or more times to a temperature of about one hundred and ten degrees Centigrade in a suitable open vessel provided internally with a series of perforated plates through which in consequence of the temperature at the bottom of the said vessel, the wort circulates rapidly, causing simultaneously the destruction of injurious ferments and other micro-organisms which may be therein contained, and also the constant filtration of the wort through the said perforated plates, inducing the deposit of nitrogenous, albuminous, glutinous or other coagulations contained therein, and finally decanting the said wort in order to separate it from the substances coagulated by the boiling, substantially as described.

2. In combination with the process set forth in Claim 1, causing the heated and epurated wort to pass whilst incompletely boiled, through a cooling apparatus causing the same to be cooled quickly down to about fifteen degrees Centigrade with or without return to the boiling vat, substantially as and for the purpose set forth.

3. An apparatus for carrying out the herein-described improved process for the manufacture of beer, consisting of a boiler of any suitable form but preferably tapering, in which plates perforated with a large number of small holes are arranged at fixed distances apart, substantially as hereinbefore described and shewn in the accompanying drawings.

Dated this 16th day of November 1898.

W. P. THOMPSON & Co.,
Of London, Liverpool, Manchester and Birmingham.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1899.